

December 1997

**Features**

- QML Qualified Per MIL-PRF-38535 Requirements
- 1.25Micron Radiation Hardened SOS CMOS
- Radiation Environment
  - Latch-up Free Under any Conditions
  - Total Dose .....  $3 \times 10^5$  RAD(Si)
  - SEU Immunity .....  $<1 \times 10^{-10}$  Errors/Bit/Day
  - SEU LET Threshold .....  $>100$ MeV/(mg/cm<sup>2</sup>)
- Input Logic Levels .....  $V_{IL} = 0.8V, V_{IH} = (V_{CC}/2)$
- Output Current .....  $\pm 12mA$
- Quiescent Supply Current .....  $20\mu A$
- Propagation Delay ..... 20ns

**Applications**

- Memory Decoding
- Data Routing
- Code Conversion

**Description**

The Radiation Hardened ACTS138MS is an Inverting 3-to-8 Line Decoder/Demultiplexer with three TTL level binary select inputs ( $A_0, A_1$  and  $A_2$ ). If the device is enabled, these inputs determine which one of the eight normally high outputs will go low.

Two active low and one active high enable inputs ( $\bar{E}_1, \bar{E}_2$  and  $E_3$ ) are provided to make cascaded decoder designs easier to implement.

The ACTS138MS is fabricated on a CMOS Silicon on Sapphire (SOS) process, which provides an immunity to Single Event Latch-up and the capability of highly reliable performance in any radiation environment. These devices offer significant power reduction and faster performance when compared to ALSTTL types.

**Specifications for Rad Hard QML devices are controlled by the Defense Supply Center in Columbus (DSCC). The SMD numbers listed below must be used when ordering.**

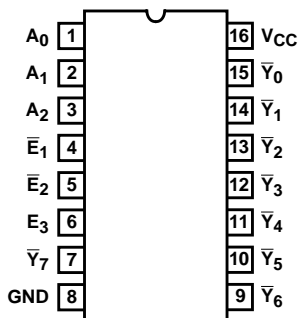
**Detailed Electrical Specifications for the ACTS138 are contained in SMD 5962-98535. A "hot-link" is provided on our homepage with instructions for downloading. <http://www.intersil.com/data/sm/index.htm>**

**Ordering Information**

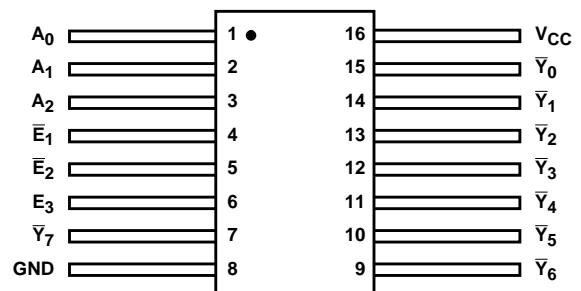
| SMD PART NUMBER | INTERSIL PART NUMBER | TEMP. RANGE (°C) | PACKAGE        | CASE OUTLINE |
|-----------------|----------------------|------------------|----------------|--------------|
| 5962F9853501VEC | ACTS138DMSR-02       | -55 to 125       | 16 Ld SBDIP    | CDIP2-T16    |
| N/A             | ACTS138D/Sample-02   | 25               | 16 Ld SBDIP    | CDIP2-T16    |
| 5962F9853501VXC | ACTS138KMSR-02       | -55 to 125       | 16 Ld Flatpack | CDFP4-F16    |
| N/A             | ACTS138K/Sample-02   | 25               | 16 Ld Flatpack | CDFP4-F16    |
| N/A             | ACTS138HMSR-02       | 25               | Die            | N/A          |

**Pinouts**

**ACTS138 (SBDIP)**  
TOP VIEW



**ACTS138 (FLATPACK)**  
TOP VIEW



# ACTS138MS

## Die Characteristics

### DIE DIMENSIONS:

Size: 2390 $\mu$ m x 2390 $\mu$ m (94 mils x 94 mils)  
Thickness: 525 $\mu$ m  $\pm$ 25 $\mu$ m (20.6 mils  $\pm$ 1 mil)  
Bond Pad: 110 $\mu$ m x 110 $\mu$ m (4.3 x 4.3 mils)

### METALLIZATION: Al

Metal 1 Thickness: 0.7 $\mu$ m  $\pm$ 0.1 $\mu$ m  
Metal 2 Thickness: 1.0 $\mu$ m  $\pm$ 0.1 $\mu$ m

### SUBSTRATE POTENTIAL:

Unbiased Insulator

### PASSIVATION

Type: Phosphorous Silicon Glass (PSG)  
Thickness: 1.30 $\mu$ m  $\pm$ 0.15 $\mu$ m

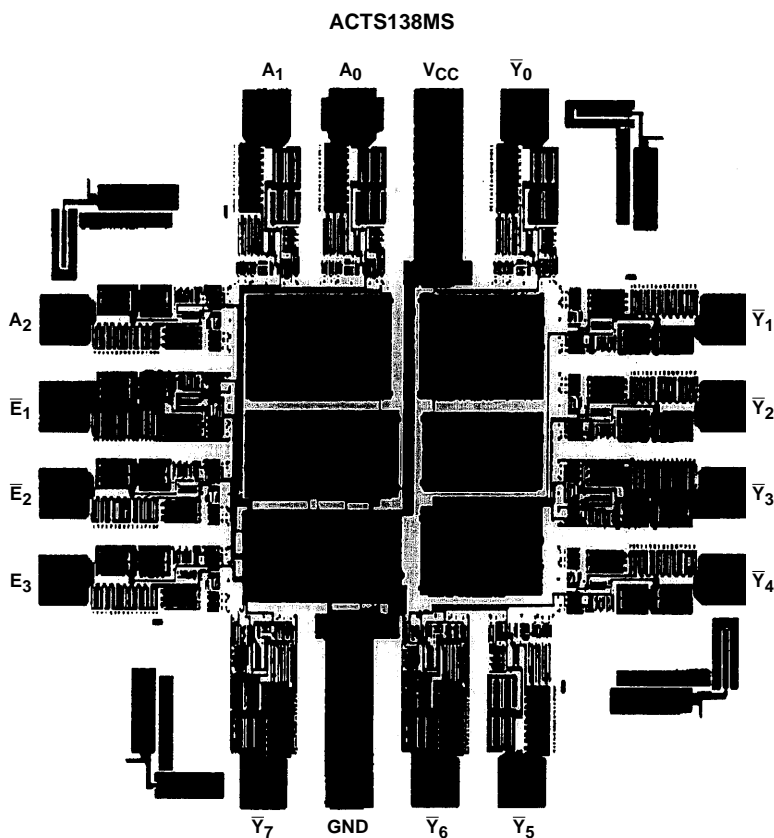
### SPECIAL INSTRUCTIONS:

Bond V<sub>CC</sub> First

### ADDITIONAL INFORMATION:

Worst Case Density: <2.0 x 10<sup>5</sup> A/cm<sup>2</sup>  
Transistor Count: 256

## Metallization Mask Layout



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